



#12

SEQUENCE LISTING

<110> Ira Herman
Alice Welch

<120> BETA-CAP73 CONTROL OF NORMAL AND
ABNORMAL CELL MIGRATION

<130> TUI-001CP

<140> US 09/750,590

<141> 2000-12-28

<150> 60/170,182

<151> 1999-12-10

<150> 09/733,818

<151> 2000-12-08

<160> 3

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 4730

<212> DNA

<213> Bos taurus

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ggggctgctc ttaatcaagt gtcgcgcgtc caaggaagat aattttcaag cgttatgaag 180
gcggagaagg attccgaaga cgaagaaaat atcccttagag atccaagcta agtgtagtgc 240
agcatgaaga ttgcagaaca ggaagagttc taagaagaag gactgagttca ctatgttagga 300
gtctctctga gggctggctt tgtgagccac agtgatttgt aacttaatgc gaactaattt 360
gctgttagca acaagaaaact aaatcctgtc t atg atg agc tgt tgg ttt tct 412
Met Met Ser Cys Trp Phe Ser

1

5

tgt gct cct aag aac aga caa gca gca gat tgg aac aaa tac gat gac 460
Cys Ala Pro Lys Asn Arg Gln Ala Ala Asp Trp Asn Lys Tyr Asp Asp
10 15 20

cga ttg atg aga gca gca gaa agg gga gat gta gaa aaa gtg tcc tca 508
Arg Leu Met Arg Ala Ala Glu Arg Gly Asp Val Glu Lys Val Ser Ser
25 30 35

atc ctt gct aaa aag gga gtc aat cca ggc aag cta gat gta gaa ggc 556
Ile Leu Ala Lys Lys Gly Val Asn Pro Gly Lys Leu Asp Val Glu Gly
40 45 50 55

aga tct gcc ttt cat gtt gtg gcc tca aag gga aat ctt gag tgt ttg 604

| | | |
|---|-----|------|
| Arg Ser Ala Phe His Val Val Ala Ser Lys Gly Asn Leu Glu Cys Leu | | |
| 60 | 65 | 70 |
| aat gcc atc ctc ata cat gga gtt gat att aca acc agt gac acc gca | | 652 |
| Aasn Ala Ile Leu Ile His Gly Val Asp Ile Thr Thr Ser Asp Thr Ala | | |
| 75 | 80 | 85 |
| gga agg aat gct ctt cac ctg gct gca aag tat ggg cat gca ctg tgt | | 700 |
| Gly Arg Asn Ala Leu His Leu Ala Ala Lys Tyr Gly His Ala Leu Cys | | |
| 90 | 95 | 100 |
| cta caa aaa ctt cta ca'g tac aat tgt ccc act gaa cat gta gac ctg | | 748 |
| Leu Gln Lys Leu Leu Gln Tyr Asn Cys Pro Thr Glu His Val Asp Leu | | |
| 105 | 110 | 115 |
| cag gga aga act gca ctt cat gat gca gct atg gca gac tgt cct tct | | 796 |
| Gln Gly Arg Thr Ala Leu His Asp Ala Ala Met Ala Asp Cys Pro Ser | | |
| 120 | 125 | 130 |
| agc ata cag ctg ctc tgc gac cat ggg gcc tcg gtg aat gcc aaa gat | | 844 |
| Ser Ile Gln Leu Leu Cys Asp His Gly Ala Ser Val Asn Ala Lys Asp | | |
| 140 | 145 | 150 |
| gta gat ggg cg ^g aca cca ctt gtt ctg gct acc cag atg tgt agg cca | | 892 |
| Val Asp Gly Arg Thr Pro Leu Val Leu Ala Thr Gln Met Cys Arg Pro | | |
| 155 | 160 | 165 |
| aca ata tgt caa ctg ctg ata gat aga ggg gcg gat att aat tcc aga | | 940 |
| Thr Ile Cys Gln Leu Leu Ile Asp Arg Gly Ala Asp Ile Asn Ser Arg | | |
| 170 | 175 | 180 |
| gac aaa caa aac agg act gct ctc atg cta gga tgc gag tat ggt tgc | | 988 |
| Asp Lys Gln Asn Arg Thr Ala Leu Met Leu Gly Cys Glu Tyr Gly Cys | | |
| 185 | 190 | 195 |
| aaa gat gca gta gaa gtc tta atc aaa aac ggc gct gac gtg acc ttg | | 1036 |
| Lys Asp Ala Val Glu Val Leu Ile Lys Asn Gly Ala Asp Val Thr Leu | | |
| 200 | 205 | 210 |
| ctg gac gcc ctt ggc cat gac agt tct tac tat gca aga att ggt gac | | 1084 |
| Leu Asp Ala Leu Gly His Asp Ser Ser Tyr Tyr Ala Arg Ile Gly Asp | | |
| 220 | 225 | 230 |
| aat ctg gac att cta acc tta ctg aag act gca tca gaa aat tcc aac | | 1132 |
| Asn Leu Asp Ile Leu Thr Leu Leu Lys Thr Ala Ser Glu Asn Ser Asn | | |
| 235 | 240 | 245 |
| aaa ggg aga gaa ctt tgg aag aaa gga cca tct tta caa cag cga aat | | 1180 |
| Lys Gly Arg Glu Leu Trp Lys Lys Gly Pro Ser Leu Gln Gln Arg Asn | | |
| 250 | 255 | 260 |
| ttg tct cag atg cta gat gaa gta aat acg aag tca aat cag agg gag | | 1228 |
| Leu Ser Gln Met Leu Asp Glu Val Asn Thr Lys Ser Asn Gln Arg Glu | | |
| 265 | 270 | 275 |
| cat caa aac att cag gat ctg gag att gaa aat gaa gat ctg aaa gag | | 1276 |
| His Gln Asn Ile Gln Asp Leu Glu Ile Glu Asn Glu Asp Leu Lys Glu | | |

| 280 | 285 | 290 | 295 | |
|---|-----|-----|-----|------|
| aga ttg aga aaa att cag caa gaa cag aga ata tta ttg gat aaa gtc Arg Leu Arg Lys Ile Gln Gln Glu Gln Arg Ile Leu Leu Asp Lys Val 300 305 310 | | | | 1324 |
| aat ggt tta cag cta cag ctg aat gag gaa gta atg gtg gct gat gat Asn Gly Leu Gln Leu Gln Leu Asn Glu Glu Val Met Val Ala Asp Asp 315 320 325 | | | | 1372 |
| ctg gaa agt gag aaa gaa aag ctg aag tcc ctt ttg gca gcc aaa gaa Leu Glu Ser Glu Lys Glu Lys Ser Leu Leu Ala Ala Lys Glu 330 335 340 | | | | 1420 |
| aag cag cat gaa gaa agc cta aga act att gag gct ctg aaa agt aga Lys Gln His Glu Glu Ser Leu Arg Thr Ile Glu Ala Leu Lys Ser Arg 345 350 355 | | | | 1468 |
| ttt aag tat ttt gag agt gat cat tta gga tca gga agt cat ttc agg Phe Lys Tyr Phe Glu Ser Asp His Leu Gly Ser Gly Ser His Phe Arg 360 365 370 375 | | | | 1516 |
| aaa gaa gat atg ctt ctt aaa caa ggt caa atg tac atg aca gac tca Lys Glu Asp Met Leu Leu Lys Gln Gly Gln Met Tyr Met Thr Asp Ser 380 385 390 | | | | 1564 |
| cag tgt act tcc aca ggc atg cca gtc cat atg caa agc cga tct atg Gln Cys Thr Ser Thr Gly Met Pro Val His Met Gln Ser Arg Ser Met 395 400 405 | | | | 1612 |
| tta aga cca ctg gag cta gcc tta cct aat caa gcc tca tat tcg gaa Leu Arg Pro Leu Glu Leu Ala Leu Pro Asn Gln Ala Ser Tyr Ser Glu 410 415 420 | | | | 1660 |
| aac gaa att tta aag aaa gaa tta gaa gca atg aga act ttc tgt gat Asn Glu Ile Leu Lys Lys Glu Leu Glu Ala Met Arg Thr Phe Cys Asp 425 430 435 | | | | 1708 |
| tca gca aaa caa gac aga ctc aaa ctc caa aat gaa ctg gct cac aag Ser Ala Lys Gln Asp Arg Leu Lys Leu Gln Asn Glu Leu Ala His Lys 440 445 450 455 | | | | 1756 |
| gtg gcg gag tgc aag gcc tta gca ttg gaa tgt gaa agg gtg aaa gag Val Ala Glu Cys Lys Ala Leu Ala Leu Glu Cys Glu Arg Val Lys Glu 460 465 470 | | | | 1804 |
| gat tca gat gag cag ata aag caa cta gaa gat gcc ttg aaa gac gtg Asp Ser Asp Glu Gln Ile Lys Gln Leu Glu Asp Ala Leu Lys Asp Val 475 480 485 | | | | 1852 |
| cag aag aga atg tat gag tcg gaa ggt aaa gtg aaa caa atg cag aca Gln Lys Arg Met Tyr Glu Ser Glu Gly Lys Val Lys Gln Met Gln Thr 490 495 500 | | | | 1900 |
| cat ttt ctt gcc ttg aaa gag cac ctg aca agt gat gcg gcc act ggg His Phe Leu Ala Leu Lys Glu His Leu Thr Ser Asp Ala Ala Thr Gly 505 510 515 | | | | 1948 |

| | | | | |
|---|-----|-----|-----|------|
| aac cac agg ctg atg gag gaa ctg aag gat cag ttg aaa gac atg aaa | 520 | 530 | 535 | 1996 |
| Asn His Arg Leu Met Glu Glu Leu Lys Asp Gln Leu Lys Asp Met Lys | | | | |
| gtg aaa tac gaa ggt gcg tcc gca gaa gtg ggg aaa ttg aga aac caa | 540 | 545 | 550 | 2044 |
| Val Lys Tyr Glu Gly Ala Ser Ala Glu Val Gly Lys Leu Arg Asn Gln | | | | |
| atc aaa caa aat gaa atg tta gtt gaa gag ttt aag aga gat gag ggc | 555 | 560 | 565 | 2092 |
| Ile Lys Gln Asn Glu Met Leu Val Glu Glu Phe Lys Arg Asp Glu Gly | | | | |
| aag ctg atg gaa gag aat aag cga ctg cag aag gag ttg agc atg tgt | 570 | 575 | 580 | 2140 |
| Lys Leu Met Glu Glu Asn Lys Arg Leu Gln Lys Glu Leu Ser Met Cys | | | | |
| gaa ctg gag cga gag aag aga gga agg aag ctc act gag atg gaa ggc | 585 | 590 | 595 | 2188 |
| Glu Leu Glu Arg Glu Lys Arg Gly Arg Lys Leu Thr Glu Met Glu Gly | | | | |
| cag tta aag gac ttg tca gcc aag ctg gcc ctt tct att cca gca gag | 600 | 605 | 610 | 2236 |
| Gln Leu Lys Asp Leu Ser Ala Lys Leu Ala Leu Ser Ile Pro Ala Glu | | | | |
| aaa ttt gaa aac atg aag agc ttg tta tca aat gaa ctg aac gag aag | 620 | 625 | 630 | 2284 |
| Lys Phe Glu Asn Met Lys Ser Leu Leu Ser Asn Glu Leu Asn Glu Lys | | | | |
| gca aaa aaa tta ata gat gtg gaa aga gaa tat gaa aga tca ctt aat | 635 | 640 | 645 | 2332 |
| Ala Lys Lys Leu Ile Asp Val Glu Arg Glu Tyr Glu Arg Ser Leu Asn | | | | |
| gaa act aga cca tta aag aga gaa ctt gag aat ttg aag gcc aaa ctg | 650 | 655 | 660 | 2380 |
| Glu Thr Arg Pro Leu Lys Arg Glu Leu Glu Asn Leu Lys Ala Lys Leu | | | | |
| gct cag cac gtc aaa cca gag gaa cat gag cag ctc aag agc aga tta | 665 | 670 | 675 | 2428 |
| Ala Gln His Val Lys Pro Glu Glu His Glu Gln Leu Lys Ser Arg Leu | | | | |
| gag cag aag tca gga gaa ctt ggg aag agg atc act gag tta aca tcg | 680 | 685 | 690 | 2476 |
| Glu Gln Lys Ser Gly Glu Leu Gly Lys Arg Ile Thr Glu Leu Thr Ser | | | | |
| aaa aat cag acg tta caa aag gaa atc gaa aag gtc tgc ctg gat aat | 700 | 705 | 710 | 2524 |
| Lys Asn Gln Thr Leu Gln Lys Glu Ile Glu Lys Val Cys Leu Asp Asn | | | | |
| aag ctc ctt aca caa gta aat aac tta aca act gaa atg aaa aat | 715 | 720 | 725 | 2572 |
| Lys Leu Leu Thr Gln Gln Val Asn Asn Leu Thr Thr Glu Met Lys Asn | | | | |
| gtc cct tta aaa gta agt gaa gaa atg aaa aag tca cat gat gta att | 730 | 735 | 740 | 2620 |
| Val Pro Leu Lys Val Ser Glu Glu Met Lys Lys Ser His Asp Val Ile | | | | |

gtt gat gat ttg aat aaa aag ctt tca gat gtg aca cac aaa tat aca 2668
 Val Asp Asp Leu Asn Lys Lys Leu Ser Asp Val Thr His Lys Tyr Thr
 745 750 755
 gaa aag aag ttg gaa atg gag aag ttg ctt atg gaa aat gcc agt tta 2716
 Glu Lys Lys Leu Glu Met Glu Lys Leu Met Glu Asn Ala Ser Leu
 760 765 770 775
 agt aaa aat gtc agc cgc ctg gaa act gtg ttc ata cct ccc gag aga 2764
 Ser Lys Asn Val Ser Arg Leu Glu Thr Val Phe Ile Pro Pro Glu Arg
 780 785 790
 cac gaa aaa gaa atg atg gct ctg aaa tcc aat atc act gaa ctt aag 2812
 His Glu Lys Glu Met Met Ala Leu Lys Ser Asn Ile Thr Glu Leu Lys
 795 800 805
 aag cag ctg tct gaa ctt aat aaa aaa tgt ggt gaa gac caa gag aaa 2860
 Lys Gln Leu Ser Glu Leu Asn Lys Lys Cys Gly Glu Asp Gln Glu Lys
 810 815 820
 ata tat tca ctc atg tct gaa aac aat gat ttg aaa aag acc atg agt 2908
 Ile Tyr Ser Leu Met Ser Glu Asn Asn Asp Leu Lys Lys Thr Met Ser
 825 830 835
 cat cag tat gtg ccc gtg aaa acc cat gaa gag att aaa act gcc ttg 2956
 His Gln Tyr Val Pro Val Lys Thr His Glu Glu Ile Lys Thr Ala Leu
 840 845 850 855
 agt agc aca ttg gat aaa acc aat aga gaa tta gta gat gtg aag aag 3004
 Ser Ser Thr Leu Asp Lys Thr Asn Arg Glu Leu Val Asp Val Lys Lys
 860 865 870
 aag tgt gaa gat ata aat caa gaa ttt gtg aaa ata aaa gat gag aac 3052
 Lys Cys Glu Asp Ile Asn Gln Glu Phe Val Lys Ile Lys Asp Glu Asn
 875 880 885
 gaa ata tta aaa aga aat ctg gag aac act cag aac caa gta aaa gct 3100
 Glu Ile Leu Lys Arg Asn Leu Glu Asn Thr Gln Asn Gln Val Lys Ala
 890 895 900
 gag tac atc agc cta aga gag cat gaa aag atg agt ggc cta agg 3148
 Glu Tyr Ile Ser Leu Arg Glu His Glu Glu Lys Met Ser Gly Leu Arg
 905 910 915
 aag agc atg aag aag gtc cag gac aac agc gct gaa ata ctg gct aag 3196
 Lys Ser Met Lys Lys Val Gln Asp Asn Ser Ala Glu Ile Leu Ala Lys
 920 925 930 935
 tac aaa aaa agc cag gag gag att gtc acc ctg cat gag gag att gca 3244
 Tyr Lys Lys Ser Gln Glu Glu Ile Val Thr Leu His Glu Glu Ile Ala
 940 945 950
 gcc cag aag aga gaa ctc gac acg ata cag gaa tgc atc aag cta aaa 3292
 Ala Gln Lys Arg Glu Leu Asp Thr Ile Gln Glu Cys Ile Lys Leu Lys
 955 960 965
 tat gct ccg atc atc agc ttg gaa gag gag tgt gag aga aaa ttt aaa gcc 3340

| | | | |
|---|------|------|------|
| Tyr Ala Pro Ile Ile Ser Leu Glu Glu Cys Glu Arg Lys Phe Lys Ala | | | |
| 970 | 975 | 980 | |
| act gag aaa gaa cta aaa gaa cag cta tcc cag cag aca cag aag tat | | 3388 | |
| Thr Glu Lys Glu Leu Lys Glu Gln Leu Ser Gln Gln Thr Gln Lys Tyr | | | |
| 985 | 990 | 995 | |
| aat acc agt gaa gaa gag gcc aag aag tgc aag caa gag aat gac aag | | 3436 | |
| Asn Thr Ser Glu Glu Ala Lys Lys Cys Lys Gln Glu Asn Asp Lys | | | |
| 1000 | 1005 | 1010 | 1015 |
| tta aag aag gag atc ctc act ctt cag aag gat cta aag gat aag aat | | 3484 | |
| Leu Lys Lys Glu Ile Leu Thr Leu Gln Lys Asp Leu Lys Asp Lys Asn | | | |
| 1020 | 1025 | 1030 | |
| gtt cac att gag aat tct tat gaa aca gaa aga gca tta agc aga aaa | | 3532 | |
| Val His Ile Glu Asn Ser Tyr Glu Thr Glu Arg Ala Leu Ser Arg Lys | | | |
| 1035 | 1040 | 1045 | |
| aca gaa gag ctg aac aga cag tta aaa gac ctg ttg cag aaa tac aca | | 3580 | |
| Thr Glu Glu Leu Asn Arg Gln Leu Lys Asp Leu Leu Gln Lys Tyr Thr | | | |
| 1050 | 1055 | 1060 | |
| gag gca aag aag gag aaa gag aag ctc gtg gag gaa aat gcc aag cag | | 3628 | |
| Glu Ala Lys Lys Glu Lys Leu Val Glu Glu Asn Ala Lys Gln | | | |
| 1065 | 1070 | 1075 | |
| act tct gag atc ctt gca gca caa act ctt ttg cag aag cag cat gtt | | 3676 | |
| Thr Ser Glu Ile Leu Ala Ala Gln Thr Leu Leu Gln Lys Gln His Val | | | |
| 1080 | 1085 | 1090 | 1095 |
| ccg ctg gag cag gtt gag tcc ctg aaa aaa tct ctt agt ggt aca atc | | 3724 | |
| Pro Leu Glu Gln Val Glu Ser Leu Lys Lys Ser Leu Ser Gly Thr Ile | | | |
| 1100 | 1105 | 1110 | |
| gag aca ctc aag gaa gaa ctg aaa act aag cag aga tgt tat gag aaa | | 3772 | |
| Glu Thr Leu Lys Glu Glu Leu Lys Thr Lys Gln Arg Cys Tyr Glu Lys | | | |
| 1115 | 1120 | 1125 | |
| gag cag cag aca gtg acc caa ctg cgg cag atg ctg gag aat cag aag | | 3820 | |
| Glu Gln Gln Thr Val Thr Gln Leu Arg Gln Met Leu Glu Asn Gln Lys | | | |
| 1130 | 1135 | 1140 | |
| aac tcc tct gtg ccc ctg gct gag cat ttg cag gtt aag gaa gca ttt | | 3868 | |
| Asn Ser Ser Val Pro Leu Ala Glu His Leu Gln Val Lys Glu Ala Phe | | | |
| 1145 | 1150 | 1155 | |
| gag aaa gaa gtt gga atc ata aaa gct agc ttg aga gaa aag gaa gaa | | 3916 | |
| Glu Lys Glu Val Gly Ile Ile Lys Ala Ser Leu Arg Glu Lys Glu Glu | | | |
| 1160 | 1165 | 1170 | 1175 |
| gaa agc caa aac aaa act gaa gag gtc tcc aaa ctc cag tct gag att | | 3964 | |
| Glu Ser Gln Asn Lys Thr Glu Glu Val Ser Lys Leu Gln Ser Glu Ile | | | |
| 1180 | 1185 | 1190 | |
| cag aat act aaa caa gcg tta aaa aaa tta gag act cgg gag gtg gtt | | 4012 | |
| Gln Asn Thr Lys Gln Ala Leu Lys Lys Leu Glu Thr Arg Glu Val Val | | | |

| 1195 | 1200 | 1205 | |
|--|------|------|------|
| gat ttg tcg aaa tat aaa gca acg aaa agc gat ttg gag aca cag att Asp Leu Ser Lys Tyr Lys Ala Thr Lys Ser Asp Leu Glu Thr Gln Ile 1210 | | | 4060 |
| tcc gac tta aac gaa aaa ttg gcc aat ctg aat agg aag tat gag gaa Ser Asp Leu Asn Glu Lys Leu Ala Asn Leu Asn Arg Lys Tyr Glu Glu 1225 | | | 4108 |
| gta tgt gag gag gtt ttg cat gcc aaa aag aag gaa ctg tct gct aaa Val Cys Glu Glu Val Leu His Ala Lys Lys Glu Leu Ser Ala Lys 1240 | | | 4156 |
| gat gag aag gaa ttg ctc cat ttc agc ata gag caa gaa atc aaa gat Asp Glu Lys Glu Leu Leu His Phe Ser Ile Glu Gln Glu Ile Lys Asp 1260 | | | 4204 |
| cag cag gaa cga tgt gac aaa tcc tta aca acc atc acg gag cta cag Gln Gln Glu Arg Cys Asp Lys Ser Leu Thr Thr Ile Glu Leu Gln 1275 | | | 4252 |
| aga aga ata cag gaa tct gcc aaa caa atc gaa gca aaa gat aat aag Arg Arg Ile Gln Glu Ser Ala Lys Gln Ile Glu Ala Lys Asp Asn Lys 1290 | | | 4300 |
| ata act gaa ctg ctc aat gat gtg gag aga tta aaa cag gcc ctc aat Ile Thr Glu Leu Leu Asn Asp Val Glu Arg Leu Lys Gln Ala Leu Asn 1305 | | | 4348 |
| ggc ctt tcc cag ctc acc tat gga agt ggg agt ccc agc aag agg cag Gly Leu Ser Gln Leu Thr Tyr Gly Ser Gly Ser Pro Ser Lys Arg Gln 1320 | | | 4396 |
| agt cag ctg att gac agc ctg cag cag gtc agg tcc ctg cag cag Ser Gln Leu Ile Asp Ser Leu Gln Gln Val Arg Ser Leu Gln Gln 1340 | | | 4444 |
| cag ctg gcg gat gcc gac aga cag cac caa gaa gta att gca att tat Gln Leu Ala Asp Ala Asp Arg Gln His Gln Glu Val Ile Ala Ile Tyr 1355 | | | 4492 |
| cgg aca cac ctt ctt agt gct gca cag ggt cac atg gat gag gat gtg Arg Thr His Leu Leu Ser Ala Ala Gln Gly His Met Asp Glu Asp Val 1370 | | | 4540 |
| cag gcc gcc tta ctg cag atc ata cag atg cgg cag ggg ctc gtg tgc Gln Ala Ala Leu Leu Gln Ile Ile Gln Met Arg Gln Gly Leu Val Cys 1385 | | | 4588 |
| tag tcg gca cccccagcc cacagtggct ttccctgctg gtgctgagca * Ser Ala 1400 | | | 4637 |
| ttctgtgcgc aacttcatgg cctttctggg cctcgctgtg ctagtataat taaaataaaag tgtatttga tccatcaaaa aaaaaaaaaaaa aaa | | | 4697 |
| | | | 4730 |

<210> 2
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<212> PRT
<213> Bos taurus

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Asp Trp Asn Lys Tyr Asp Asp Arg Leu Met Arg Ala Ala Glu Arg Gly
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Asp Val Glu Lys Val Ser Ser Ile Leu Ala Lys Lys Gly Val Asn Pro
35 40 45
Gly Lys Leu Asp Val Glu Gly Arg Ser Ala Phe His Val Val Ala Ser
50 55 60
Lys Gly Asn Leu Glu Cys Leu Asn Ala Ile Leu Ile His Gly Val Asp
65 70 75 80
Ile Thr Thr Ser Asp Thr Ala Gly Arg Asn Ala Leu His Leu Ala Ala
85 90 95
Lys Tyr Gly His Ala Leu Cys Leu Gln Lys Leu Leu Gln Tyr Asn Cys
100 105 110
Pro Thr Glu His Val Asp Leu Gln Gly Arg Thr Ala Leu His Asp Ala
115 120 125
Ala Met Ala Asp Cys Pro Ser Ser Ile Gln Leu Leu Cys Asp His Gly
130 135 140
Ala Ser Val Asn Ala Lys Asp Val Asp Gly Arg Thr Pro Leu Val Leu
145 150 155 160
Ala Thr Gln Met Cys Arg Pro Thr Ile Cys Gln Leu Leu Ile Asp Arg
165 170 175
Gly Ala Asp Ile Asn Ser Arg Asp Lys Gln Asn Arg Thr Ala Leu Met
180 185 190
Leu Gly Cys Glu Tyr Gly Cys Lys Asp Ala Val Glu Val Leu Ile Lys
195 200 205
Asn Gly Ala Asp Val Thr Leu Leu Asp Ala Leu Gly His Asp Ser Ser
210 215 220
Tyr Tyr Ala Arg Ile Gly Asp Asn Leu Asp Ile Leu Thr Leu Leu Lys
225 230 235 240
Thr Ala Ser Glu Asn Ser Asn Lys Gly Arg Glu Leu Trp Lys Lys Gly
245 250 255
Pro Ser Leu Gln Gln Arg Asn Leu Ser Gln Met Leu Asp Glu Val Asn
260 265 270
Thr Lys Ser Asn Gln Arg Glu His Gln Asn Ile Gln Asp Leu Glu Ile
275 280 285
Glu Asn Glu Asp Leu Lys Glu Arg Leu Arg Lys Ile Gln Gln Glu Gln
290 295 300
Arg Ile Leu Leu Asp Lys Val Asn Gly Leu Gln Leu Asn Glu
305 310 315 320
Glu Val Met Val Ala Asp Asp Leu Glu Ser Glu Lys Glu Lys Leu Lys
325 330 335
Ser Leu Leu Ala Ala Lys Glu Lys Gln His Glu Glu Ser Leu Arg Thr
340 345 350
Ile Glu Ala Leu Lys Ser Arg Phe Lys Tyr Phe Glu Ser Asp His Leu
355 360 365
Gly Ser Gly Ser His Phe Arg Lys Glu Asp Met Leu Leu Lys Gln Gly
370 375 380
Gln Met Tyr Met Thr Asp Ser Gln Cys Thr Ser Thr Gly Met Pro Val
385 390 395 400
His Met Gln Ser Arg Ser Met Leu Arg Pro Leu Glu Leu Ala Leu Pro

405 410 415
Asn Gln Ala Ser Tyr Ser Glu Asn Glu Ile Leu Lys Lys Glu Leu Glu
420 425 430
Ala Met Arg Thr Phe Cys Asp Ser Ala Lys Gln Asp Arg Leu Lys Leu
435 440 445
Gln Asn Glu Leu Ala His Lys Val Ala Glu Cys Lys Ala Leu Ala Leu
450 455 460
Glu Cys Glu Arg Val Lys Glu Asp Ser Asp Glu Gln Ile Lys Gln Leu
465 470 475 480
Glu Asp Ala Leu Lys Asp Val Gln Lys Arg Met Tyr Glu Ser Glu Gly
485 490 495
Lys Val Lys Gln Met Gln Thr His Phe Leu Ala Leu Lys Glu His Leu
500 505 510
Thr Ser Asp Ala Ala Thr Gly Asn His Arg Leu Met Glu Glu Leu Lys
515 520 525
Asp Gln Leu Lys Asp Met Lys Val Lys Tyr Glu Gly Ala Ser Ala Glu
530 535 540
Val Gly Lys Leu Arg Asn Gln Ile Lys Gln Asn Glu Met Leu Val Glu
545 550 555 560
Glu Phe Lys Arg Asp Glu Gly Lys Leu Met Glu Glu Asn Lys Arg Leu
565 570 575
Gln Lys Glu Leu Ser Met Cys Glu Leu Glu Arg Glu Lys Arg Gly Arg
580 585 590
Lys Leu Thr Glu Met Glu Gly Gln Leu Lys Asp Leu Ser Ala Lys Leu
595 600 605
Ala Leu Ser Ile Pro Ala Glu Lys Phe Glu Asn Met Lys Ser Leu Leu
610 615 620
Ser Asn Glu Leu Asn Glu Lys Ala Lys Lys Leu Ile Asp Val Glu Arg
625 630 635 640
Glu Tyr Glu Arg Ser Leu Asn Glu Thr Arg Pro Leu Lys Arg Glu Leu
645 650 655
Glu Asn Leu Lys Ala Lys Leu Ala Gln His Val Lys Pro Glu Glu His
660 665 670
Glu Gln Leu Lys Ser Arg Leu Glu Gln Lys Ser Gly Glu Leu Gly Lys
675 680 685
Arg Ile Thr Glu Leu Thr Ser Lys Asn Gln Thr Leu Gln Lys Glu Ile
690 695 700
Glu Lys Val Cys Leu Asp Asn Lys Leu Leu Thr Gln Gln Val Asn Asn
705 710 715 720
Leu Thr Thr Glu Met Lys Asn Val Pro Leu Lys Val Ser Glu Glu Met
725 730 735
Lys Lys Ser His Asp Val Ile Val Asp Asp Leu Asn Lys Lys Leu Ser
740 745 750
Asp Val Thr His Lys Tyr Thr Glu Lys Lys Leu Glu Met Glu Lys Leu
755 760 765
Leu Met Glu Asn Ala Ser Leu Ser Lys Asn Val Ser Arg Leu Glu Thr
770 775 780
Val Phe Ile Pro Pro Glu Arg His Glu Lys Glu Met Met Ala Leu Lys
785 790 795 800
Ser Asn Ile Thr Glu Leu Lys Lys Gln Leu Ser Glu Leu Asn Lys Lys
805 810 815
Cys Gly Glu Asp Gln Glu Lys Ile Tyr Ser Leu Met Ser Glu Asn Asn
820 825 830
Asp Leu Lys Lys Thr Met Ser His Gln Tyr Val Pro Val Lys Thr His
835 840 845
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